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# Anaphylaxis caused by topical application of a sunscreen containing benzophenone-3

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**Key words:** anaphylaxis; benzophenone-3; contact urticaria; immediate-type hypersensitivity; oxybenzone; sunscreen.

Adverse reactions are increasingly reported for ultraviolet (UV) filters used in sunscreens. We report the third case in the literature of an anaphylactic reaction after topical application of a benzophenone-3-containing sunscreen.

## Case History

About 15 min after applying a sunscreen (Sunspray™ SPF 15 water resistant; Hegron Cosmetics®, Purmerend, the Netherlands) all over her body and before sun exposure, a 44-year-old woman fainted with generalized wheals, an inspiratory stridor, low blood pressure (74/46 mmHg), and increased heart rate. She required resuscitation with epinephrine, dexamethasone, clemastine, and saline and was transferred to a hospital. Some months before, she had experienced pruritus, erythema, and nausea within 30 min of putting on her bathing suit, which she had also worn earlier while she applied the sunscreen. She had used the sunscreen previously without apparent problem. She had no relevant past history.

Patch testing with benzophenone-3 (10% pet.; Trolab™, Hermal, Reinbek, Germany) resulted in an urticarial reaction at the test site within 20 min. Patch tests with the European baseline series (TRUE™ test; Mekos, Hillerød, Denmark) and textile, cosmetic, and perfume series were negative. Photo patch tests (without benzophenone-3) were negative. No specific immunoglobulin E (IgE) antibodies were found against inhalation allergens or latex. An assay for detection of IgE to benzophenone-3 was explored by incubating benzophenone-3 with human serum albumin immobilized to caps followed by specific IgE measurement (ImmunoCap; Phadia, Uppsala, Sweden), but no specific IgE to benzophenone-3 could be detected.

## Discussion

Benzophenone-3 (INN oxybenzone, CAS number 131-57-7) has been commonly used as a UV filter. In the Netherlands, it was found in 49 of 162 (30%) tested samples of commercial sunscreens (1). Benzophenone-3 was the most frequent cause of photocontact allergy in several reports. Other types of hypersensitivity reactions to it have been reported: contact allergy, photocontact urticaria, and contact urticaria (2). Two earlier cases of contact anaphylaxis induced by benzophenone-3 have been reported (3, 4).

Contact urticaria is divided into immunological and non-immunological types. Non-immunological contact urticaria is often less severe and does not depend on specific IgE against the substance. In our case, the severity of the reaction and the observation that hypersensitivity was acquired are arguments to suggest an immunological mechanism. The severity of the clinical reaction experienced might depend partly on the amount of skin exposed to benzophenone-3; patch testing did not elicit anaphylaxis in our patient or in an earlier reported case. Although IgE specific against benzophenone-3 could not been shown, the methodology is not reliable for benzophenone-3 as it is a small lipophilic molecule and it is unknown to what extent it was bound to the caps; a positive control was lacking.

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